

WYOMING TELEHEALTH NETWORK

A PROPOSAL TO

FEDERAL COMMUNICATIONS COMMISSION

RURAL HEALTH CARE PILOT PROGRAM

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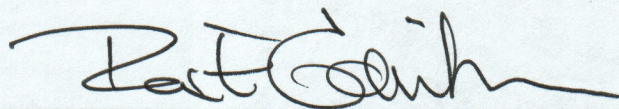
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Wyoming Telehealth Network (WyTeN) Rural Health Care Pilot Project Proposal

Summary

The State of Wyoming requests funding from the Federal Communication Commission Rural Health Care Pilot Program to design and implement the Wyoming Telehealth Network, a statewide telecommunications system that will link all hospitals, community mental health centers, and substance abuse clinics in the state. As the least populous of all the United States, Wyoming has a significant rural population and a severe shortage of mental health care providers, particularly in the smaller, rural communities. Much research has been done showing the effectiveness of telehealth technology in delivering mental health services to remote locations. We believe that the development of a telehealth network for the state's hospitals and mental health/substance abuse facilities will significantly improve our residents' access to quality health care services.

The goal of this proposal is to design and implement a dedicated, high-speed network to connect seventy-two health care facilities throughout Wyoming. The proposed project represents a consortium of health care providers, public and private organizations, and state agencies that have come together to partner in the project. The design and implementation will be contracted out through competitive bidding. The University of Wyoming Center for Rural Health Research and Education, a unit of the College of Health Sciences at the University, will be legally and financially responsible for the project.

We anticipate the costs for designing, installing, and maintaining the network over a two-year period for the seventy-two sites in the state will total \$916,194. These costs include an aggregation point for the network at the University of Wyoming, which will then provide access for all members of the network to the Internet 2 backbone through the Front Range GigaPop in Colorado. We are requesting 85% of these costs, or \$778,765, from the Rural Health Care Pilot Program. The remaining 15% of the costs (\$137,429) will be covered by combined support from the Wyoming Department of Health, the Wyoming State Office of Rural Health, the Wyoming Association of Mental Health and Substance Abuse Centers, and the for-profit hospitals participating in the network. There are additional costs for contract and project management – not requested from this program – that will be covered through other sources.

We are confident that the creation of this network infrastructure will support a significant increase in the availability of telehealth services in the state, particularly in the areas of mental health care and substance abuse treatment. Three of the partners in the project – the Wyoming Department of Health, the UW Center for Rural Health Research and Education, and Cheyenne Regional Medical Center – already have experience in developing and operating telehealth projects in the state, and resources to support this development are available through resource centers and Federal agencies with which all these organizations have affiliations.

The project will be coordinated through a steering committee composed of representatives from the network partners and the participating facilities that will provide oversight of the project and, with assistance from a project manager, work with the contractor to ensure timely completion of the deliverables for the project. The committee will also develop a plan for sustaining the network beyond the two-year development period.

This proposal has widespread support in the state, as indicated by letters included with the proposal from a variety of organizations and Wyoming's entire Congressional delegation.

Wyoming Telehealth Network (WyTeN) Rural Health Care Pilot Project Proposal

1. Introduction

Wyoming is a frontier state, with 509,294 people living in 97,100 square miles, according to 2005 estimates (Census, 2006). It is currently the least populated state in the Union, smaller even than the District of Columbia. The land is high desert with mountain ranges with elevations ranging from 3,099 to 13,804 feet above sea level. The mean elevation is 6,700 above sea level, ranking Wyoming second among the 50 states. The climate is relatively cold with a normal daily mean temperature of 45.6 degrees Fahrenheit, and Wyoming records the highest average wind speed in miles per hour (12.9) of all the states. Although Wyoming's per capita income is 15th among the states and had the highest percentage growth of any state in 2004-2005, the estimated gross state product in 2004 ranked 48th in the nation, higher only than Vermont and North Dakota (Census, 2006).

Like other rural populations, Wyoming's citizens continually face problems in accessing quality health care and health education. It is well known that while a quarter of the U.S. population lives in rural areas, relative to urban populations rural residents generally fare worse on many key indicators of population health (Eberhardt, 2004). They have higher rates of premature and infant mortality, as well as higher death rates from unintentional injuries, suicide, chronic obstructive pulmonary disease, and cancer. They are more likely to smoke, be obese, and be arrested for driving under the influence of alcohol.

The disparities between rural and urban health and health care accessibility are particularly great in Wyoming. Distance, geography, inclement weather, and rural communities all present challenges for the state's residents in gaining access to health care. The physical geography and weather can be severe, and the long winters and inclement weather limit travel and access to services¹. Many of Wyoming's residents must travel long distances for health care services, and often they must seek care in neighboring states when unable to access needed care in Wyoming. A major contributor to this problem is the lack of providers in the state. Population dispersion makes it difficult to achieve the economy of scale necessary to support adequate primary care, much less specialty care (the Wyoming Medical Society lists only eight active oncologists in the entire state). Ten of its twenty-three counties qualify in their entirety as Health Professional Shortage Areas for primary care (seven others contain shortage areas), and eighteen counties qualify as Mental Health Professional Shortage Areas (HRSA, 2006).

Currently Wyoming is ranked forty-fifth among the fifty states in physicians per 100,000 population (Census, 2006). A recent survey (WYSAC, 2006) found that a majority of health care facilities in the state suffer from staffing shortages, most notably physicians (38% of positions are open) and registered nurses (40%). Burnout and compassion fatigue among healthcare providers, which contribute to high turnover and increased error risk, compound these shortages. The WYSAC survey found that the reasons why open positions in primary care remain unfilled or suffer from high turnover include low salaries, distance to larger cities, and lack of job opportunities for spouses of staff.

Access to mental health care is a particular problem in Wyoming, as it is in other rural/frontier states (McDonald, 2006); only 18 psychiatrists are licensed in the state (and only two of these include a specialization in children). Additionally, there are only four certified psychological practitioners, two licensed school psychologists, and two hundred licensed psychologists in Wyoming, according to the Wyoming Department of Health².

The primary issue in access to quality health care services, one of the ten Leading Health Indicators identified in the Public Health Service's Healthy People 2010 initiative (PHS, 2006), in rural/frontier areas has been identified as how to overcome the geographic distance and spatial isolation. The use of health information technology (HIT) has significant potential to improve the delivery of healthcare services, providing higher quality and safer healthcare at lower costs. HIT includes a number of specific initiatives, such as:

¹ Wyoming ranks first per capita in the nation for consumption of gasoline, number of motor vehicles, and annual vehicle miles driven (Federal Highway Administration, 2003).

² The majority of these mental health professionals are located in the larger cities in the state, so mental health services are often not available to residents in smaller communities or rural areas without significant travel.

- Electronic prescribing of medications;
- Continuity of care records;
- Access for local providers to hospital systems;
- Integrated evidence-based practice guidelines, compatible with pay-for-performance incentives;
- Automated patient chart generation;
- Ongoing data collection and analysis to provide operational and quality improvement measures;
- Increased use of *telehealth* and *telemedicine*.

Of these initiatives, a very promising technology with application to rural health care delivery is *telehealth*, one definition of which is “telecommunication technologies to support long-distance clinical health care, patient and professional health-related education, public health, and health administration” (Gantenbein, 2004). This is a slightly more inclusive term than *telemedicine*, which is defined by the American Telemedicine Association as “the use of medical information exchanged from one site to another via electronic communications to improve patients' health status” (ATA, 2005).

Numerous studies have underscored the potential of Internet-based telehealth technology to establish statewide networks of providers and resources, increase coordination of evaluations, decrease the disparity of rural and urban healthcare access, and decrease the impact of healthcare provider shortages (APA, 1998; Darkins, 2005; Effertz, 2004; Hilty, 2002; Hyler, 2005; Rees, 2004; Troster, 1995; Turner, 2001). Useful criteria identified by the Institute of Medicine for evaluating these technologies include cost, access, acceptability and quality (Canada, 2000). Since health technologies continue to evolve rapidly and initiate cascading shifts in the technical, legal, political and financial environments, implementation of new programs requires decision-making based on a wide range of situation-specific circumstances. Hilty describes this approach as “fitting technology to the task” rather than adapting practice to technology (2002, p. 530).

Limited availability of healthcare providers, significant distances, and environmental factors make it difficult to connect patients with providers of psychiatric care in rural settings. The use of telehealth applications to connect providers and patients across distance is an effective tool for improving the psychiatric well-being of rural populations. Telehealth, according to Effertz (2004) is “the use of electronic information, imaging and communication technologies to provide and support health care when distance separates the participants.” The application of telehealth technology to the practice of psychiatry and associated disciplines is referred to as tele-mental health or telepsychiatry (Darkins, 2005). These technologies can include “telephone, facsimile, electronic mail, the Internet, still and live imaging, and interactive two-way audio-video communication or interactive television. The format currently most applicable to psychiatry is videoconferencing” (Hilty, 2002).

Decreasing travel time and related costs is one advantage of telepsychiatry and other telehealth applications in rural areas. High fuel prices, long travel times, lack of public/mass transportation, and challenging geography and weather contribute to practitioners' reservations about traveling to assess a new patient who, for example, may not keep the appointment. The use of telepsychiatry also decreases the disruption of travel away from the office, allowing practitioners to maintain patient volume and maximize time with patients (Hilty, 2002).

Although specific cost benefit analysis is difficult with telepsychiatry, initial considerations should include equipment, transmission lines, supplies, salaries, data communication costs, and administrative overhead (APA, 2004; Canada, 2000; Darkins, 2005; Effertz, 2004). The Veterans' Administration has demonstrated significant cost avoidance and savings using telepsychiatry through decreased hospital admissions, decreased length of stay per admission, decreased inpatient cost per patient per year, and decreased outpatient cost (Urdiales, 2005).

In addition to its potential cost benefits, telepsychiatry allows access to care that could not otherwise be obtained (Gunter, 2003; Rees, 2004; Schopp, 2000; Troster, 1995). Patients are able to access care closer to work and home, thus decreasing commute time and lost work days. For many areas in Wyoming, travel to a provider typically requires several hours commute, resulting in a disruption of routine, loss of work and income, and significant expense.

Anecdotally, both patients and physicians find telepsychiatry acceptable. Issues associated with satisfaction include transmission factors; personal characteristics such as age, gender and ethnicity; diagnosis

and current condition; cost, waiting and travel time; availability of alternative care; provider qualities and local environment (Hilty, 2002). Several studies have emphasized the importance of audio quality and adequate technical support (Hilty, 2002). Recommendations for high-quality telepsychiatry emphasize appropriate equipment, onsite technical support, informed troubleshooting, and *adequate evaluation/feedback mechanisms* for both consultations and the overall program (see sidebar).

Patient and provider satisfaction has become increasingly important as reliability and quality issues are clarified. Telepsychiatry benefits identified by patients include decreased waiting time, decreased cost, decreased travel time, increased availability of specialist care, and ability to stay in their local setting (Hilty, 2002; Turner, 2001; Urdiales, 2005). A Montana study found that appointment adherence was actually higher with telepsychiatry than face-to-face appointments (Hilty, 2002). Additionally, patients state that they are comfortable talking about complex issues via telepsychiatry (Hilty, 2002). In general, patients and providers prefer in-person (IP), if close to home, but adapt to telepsychiatry to avoid travel time (Hilty, 2002). Less information is available about providers' perceptions. Providers

identify concerns about telepsychiatry associated with "ease of use, ability to express oneself and quality of the interpersonal relationship" (Hilty, 2002). Specific problems interfering with successful telepsychiatry sessions include technical instability and poor quality transmission, particularly poor audio quality (Hilty, 2002).

After reviewing 380 articles related to telepsychiatry published between 1956 and 2002, Hyler, Gangure, & Batchelder (2005) completed a meta-analysis of 14 selected studies that had a sample size greater than 10 subjects. The studies included patients with diverse diagnoses, ages, nationalities, and surroundings. Using objective assessment tools, the researchers directly compared IP with telepsychiatry for reliability and quality issues. They found that, in situations where IP is not available or is impractical, telepsychiatry is "a reasonable alternative" (p. 411). They concluded that "*there is no difference in accuracy or satisfaction between the two modalities [Emphasis added]*" (p. 411).

Published reports of cognitive exams via telepsychiatry concluded that "telepsychiatry can be used reliably" in such examinations (Hilty, 2002, p. 534), although attention and sensory deficits (hearing and sight) detract from consistency at 128 kilobytes per second (kbps). Reliability appears to be improved at higher bandwidth (Hyler, 2005). "Motor restlessness, uncooperativeness, mannerisms and posturing" (Hilty, 2002, p.

Guidelines for delivering high-quality telepsychiatry service [Hilty, 2002, p. 544]

- Use clinically proven technology
- For each consultation, be certain that the technical quality of the equipment is appropriately matched to the service and needs of the patient and his/her condition
- Evaluate options, implementation and maintenance of telepsychiatry with a team of clinicians, technicians and administrators in both the 'hub' and the 'spoke' sites
- Adequately train the hub site coordinator and spoke site coordinator in the technical and procedural aspects of the service
- Provide adequate training for the telepsychiatrist with the technology, work with them to adapt clinical practice to fit its use and be certain that they are aware of its limitations
- Ensure that the telepsychiatrist has general and specific expertise (e.g. consultation-liaison for consultations to primary care, geriatric psychiatry for a geriatric patient)
- Develop referral and/or consultation guidelines, as well as adequate procedures for getting the key components of the record to the consulting physician
- Ensure satisfactory telecommunication by regular technical maintenance and prompt troubleshooting
- Coordinate timing of consultation (i.e. the patient is there at the right time, the telepsychiatrist has adequate time and/or referring physicians or staff stop in if desired)
- Adequately evaluate satisfaction and outcomes for each consultation (patient, referring physicians and consulting physician) and the program (coordinator, technical staff and administration). Have adequate feedback mechanisms to deliver this information to telemedicine

534) also are difficult to evaluate accurately at a distance, particularly in patients with dementia, who may have trouble responding to questions. Separate studies reported reliable evaluations using objective assessment of observable behavior (e.g., blunted affect, motor retardation or restlessness, and emotional withdrawal) and “no significant differences between the telepsychiatry and in-person groups” on the National Adult Reading Test, the Quick Test, and sections of the Adult Memory and Information Processing Battery (Hilty, 2002, p. 534). Excellent reliability for clinical diagnoses for obsessive-compulsive disease, depression and anxiety has been reported (Hilty, 2002). Good results for treatment of schizophrenia have also been reported at higher bandwidths (Hyler, 2005; Rees, 2004; Schopp, 2000). No studies were identified that dealt with continuing therapy via telepsychiatry (Hyler, 2005).

There are currently no technical standards established for telepsychiatry; however, the practice subgroup of the American Telemedicine Association (ATA) recommends the following: 384 kbps, audio frequency of G.722 minimum, frame rates average of 16-30 frames per second (fps), gaze angles less than or equal to 12 degree, no anamorphic resizing, minimum VTC screen size of 21 inches, network ISDN or encryption of IP with minimum key length of 128 bits. Grady notes that there are several pertinent variables, including, “experience of the teleprovider, presence of organic/iatrogenic movement disorders, extent and availability of treatment records, prior face-to-face evaluation and/or therapeutic relationship with the teleprovider” (Grady, 2005). Grady notes that he has provided “initial and ongoing care at bandwidths of 128 and 256 kbps and for these situations found the bandwidth adequate for the intended patient and /or purpose.” He further notes that the delay of the video signal from capture to display of more than 150-200 milliseconds is sufficient to make communication “frustrating enough to most people that it interferes with the rapport and context of the conversation.”

Additional requirements for telepsychiatry include provision of appropriate care at the patient’s site, including protocols for staff and patient safety and emergency procedures. Development of specific standard operating procedures for telepsychiatry is required. These protocols must address informed consent, privacy, data security, and medical records. Legal regulations for telepsychiatry are not fully developed currently in most states, including Wyoming. Additionally, legal regulations developed to address specific situations, such as correctional facilities or online prescribing, impact telepsychiatry. While many of these regulations were meant to assure a professional relationship between physician and patient for online prescriptions, they may impact applications using telepsychiatry for assessment or ongoing therapy (Gunter, 2003). An out-of-state consultant to a licensed (in-state) physician “typically has not had to be licensed” (Gunter, 2003, p. 12). Regulations for non-physician, licensed mental-health providers (e.g. social workers, psychiatric nurses) are less clear. Legal counsel is strongly recommended for licensure or other legal concerns specific to Wyoming.

Telepsychiatry can offer Wyoming’s citizens significantly improved access to quality care at decreased cost to the provider and patient. Although there are few studies that include data specific to Wyoming, it is expected that patients and providers will find telepsychiatry acceptable since several studies have demonstrated its reliability and acceptability in similar contexts. Limited numbers of healthcare providers, significant distances, and a challenging environment make Wyoming a prime candidate for telepsychiatry. Telepsychiatry could allow for the provision of more convenient, cost-effective, and timely psychiatric care for both patients and providers.

2. Goals and Objectives

Studies such as those just cited have shown that, when available, telehealth technologies do address problems in delivering health care services such as mental health that are not often available in rural communities. A robust and reliable telehealth system also enables other activities that can improve healthcare in rural areas through its enabling of data sharing among facilities and providers and the delivery of continuing professional education to practitioners in small communities. However, consistent and reliable high-speed network access is a fundamental requirement for such services to take place.

The goal of the proposed project will be to construct the Wyoming Telehealth Network (WyTeN), a dedicated high-speed network connecting hospitals, community mental health clinics, and substance abuse treatment centers throughout the state of Wyoming. The project will bring together providers, consumers, and technical specialists to develop advanced telecommunications capabilities that will enhance healthcare in the state, particularly treatment for mental health and substance abuse, two areas in which there are proven shortages of services in Wyoming. In addition, through supporting connectivity to Internet 2, the ability to share information and services with the neighboring states in which a significant portion of care is provided to Wyoming residents will also be significantly improved.

The specific objectives of the project will be to:

- Create a consortium of providers to participate in the pilot project;
- Design a network that will support high-speed Internet access among the consortium as well as access to Internet 2;
- Obtain the appropriate resources to implement this design;
- Identify applications that will operate on the network; and
- Develop a plan for managing and sustaining the network once it is in place.

This project will be conducted as a public-private partnership between several organizations involved in health care in Wyoming. The University of Wyoming Center for Rural Health Research and Education (CRHRE, pronounced “share”) will be legally and financially responsible for conducting the activities in the project. The CRHRE is dedicated to developing interdisciplinary approaches to integrating technology with research and education to improve the health of rural populations. CRHRE staff have expertise in network and system administration, software system engineering, instructional technology, distance education, and health informatics, and have been involved in a variety of projects integrating technology with health and health research, including a major telehealth initiative, which is described below.

Other partners in the project represent a broad spectrum of organizations in the state. They include:

- Cheyenne Regional Medical Center, a 218-bed, non-profit, regional healthcare system located in Cheyenne, Wyoming;
- Community Health Center of Central Wyoming, a non-profit, community-owned federally qualified health center in Casper, Wyoming;
- The Wyoming Hospital Association, a member owned, private, non-profit organization representing Wyoming hospitals;
- The Wyoming Association of Mental Health and Substance Abuse Centers, a consortium of the mental health and substance abuse centers throughout the state that serve as the delivery system for state-funded public mental health and substance abuse treatment;
- The Wyoming Health Information Organization, an independent non-profit organization that serves as the state’s Regional Health Information Organization and is devoted to the creation of a Health Information Exchange (HIE) network;
- The Wyoming State Department of Health, Division of Community and Rural Health and Division of Mental Health;
- Telecommunications service providers, including Qwest Communications, the largest network voice, video and data services provider in Wyoming;
- The University of Wyoming Information Technology Division, which manages the Internet 2 connectivity for the University; and

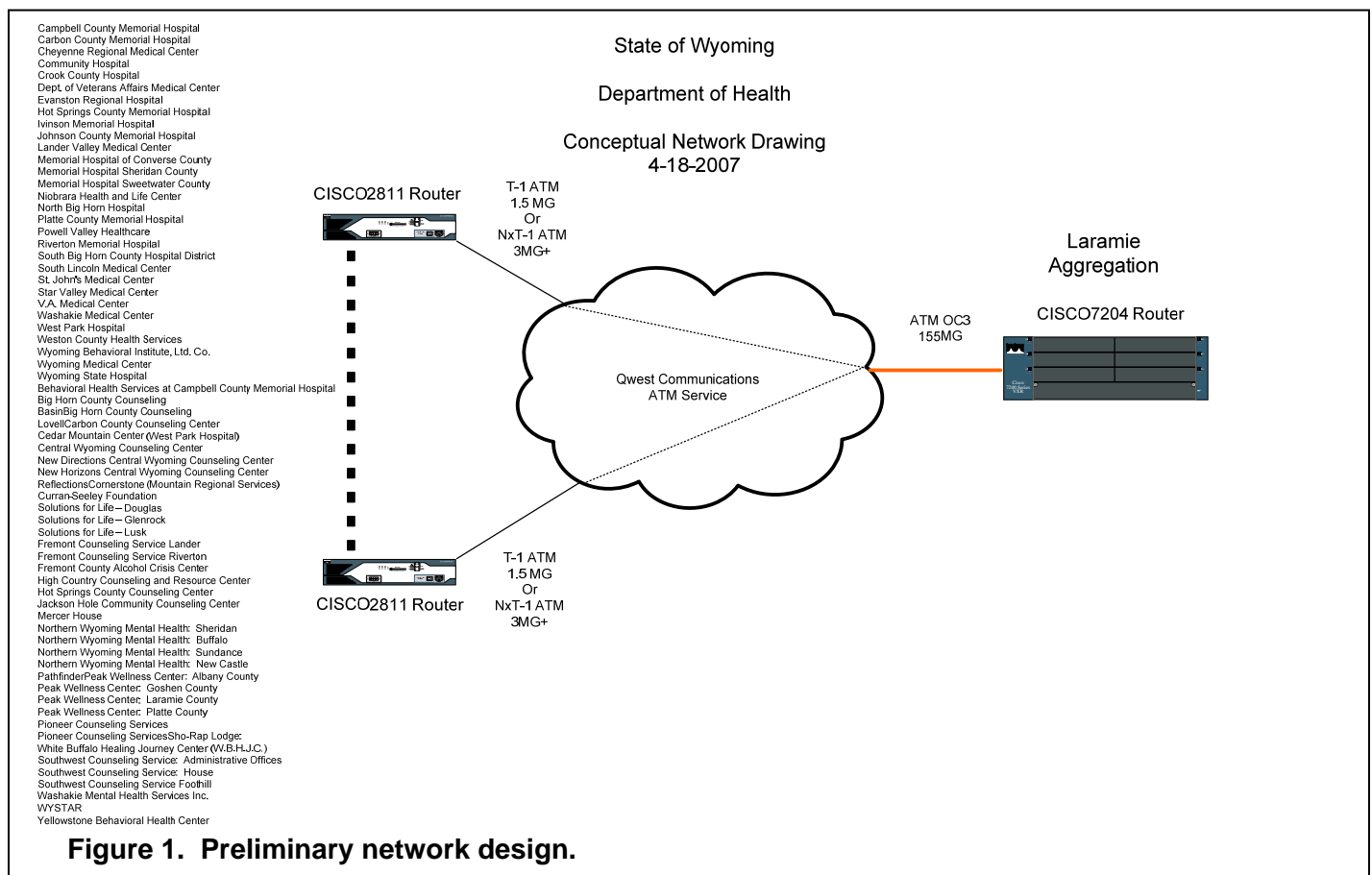
- The Wyoming Primary Care Association, which represents Wyoming's community health centers, including migrant and homeless centers that operate primary care sites statewide for the benefit of the medically underserved and uninsured.

Design and implementation of the network will be contracted out through a competitive bid process to an organization capable of carrying out these activities. The contracted agency will work with the partners to develop the network as outlined in the management and coordination plan below.

3. Financial Projections and Support

The Wyoming Telehealth Network will support dedicated, high-speed network connectivity for the thirty hospitals and forty-two community mental health centers/substance abuse clinics in Wyoming (seventy-two sites in all). A preliminary design (Figure 1) developed in cooperation with Qwest Communications would place a Cisco router at each remote site and provide connectivity through an ATM “cloud” to an aggregation point, which will be at the University of Wyoming in Laramie. In addition to simplifying the design, this approach will eliminate the interruption of service at multiple sites when one line becomes inoperative that occurs with “hub-and-spoke” networks.

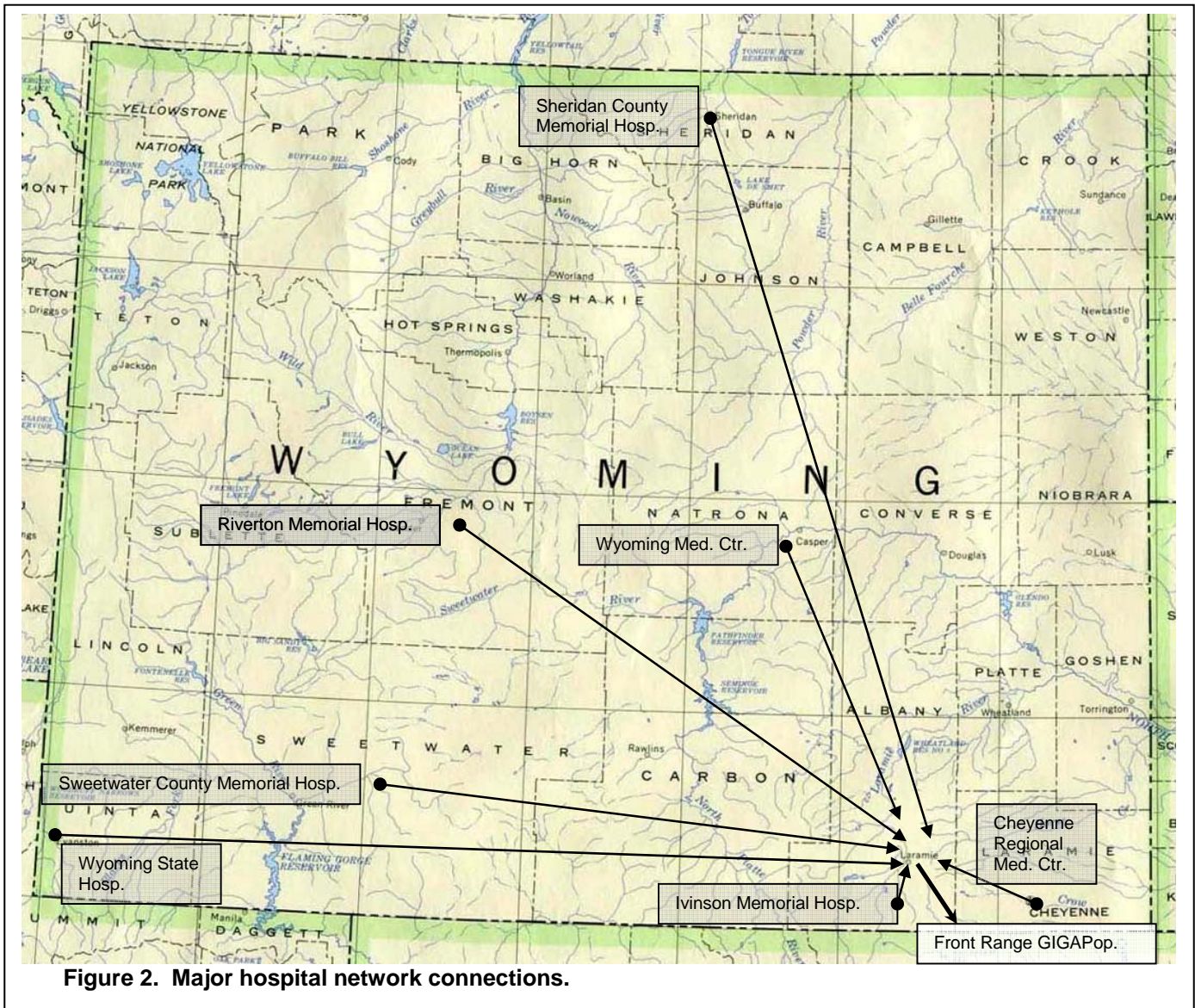
We anticipate the cost for these routers and associated equipment and services to be \$4,677 per site, plus one-time charges of \$625 for installation and \$500 for equipment maintenance during the project period. The cost of equipment for the aggregation point is estimated at \$19,760 for a large router and associated



equipment, plus \$1,200 for installation and \$3,282 for maintenance.

This preliminary design proposes that the seven of the larger hospitals distributed throughout the state be connected to the aggregation point through dual T-1 ATM lines as shown in Figure 2. Line installation costs for these seven sites are projected to be \$1,600 per site, with monthly line charges of \$758 per site after installation. The other sixty-five sites (the smaller hospitals and clinics) will be connected to the aggregation point through single T-1 ATM connections; since there are multiple telecommunications providers that serve these sites, the line installation charges will vary from \$900 (Qwest services, which already have physical connectivity) to \$3,848 (non-Qwest service with physical lines required to be laid). Line charges for these sites are estimated at \$378 per site per month.

We also propose to connect the network to Internet 2 so that we can provide access to sites outside of Wyoming. This connection will be made through the aggregation point at the University of Wyoming, which is already a member of the Internet 2 Consortium and is connected to the Internet 2 backbone through the Front



Range GIGAPop (FRGP) in Colorado. UW has developed the BISON ring, shown in Figure 3, which supports redundant, high-speed links to the FRGP and, with the additional router to be purchased through this proposal, will have the capacity to accommodate up to 100 additional T-1 circuits to the backbone. Line installation for the aggregation point is estimated at \$1,200, with monthly line charges of \$2,092.

Table I below summarizes the projected costs for equipment purchases, installation, and line charges for the Wyoming Telehealth Network by type of site. Note that equipment purchases and installation³ and line installations are budgeted for the first year of the project, while equipment maintenance and monthly line charges are budgeted for the second year. This reflects our management and coordination plan (see Section 6) to create the network over a two-year period.

³ Network design costs are incorporated into the estimated costs of the equipment and installation and will be included in the contract for the network development, as discussed in Section 6.

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BiSON Network

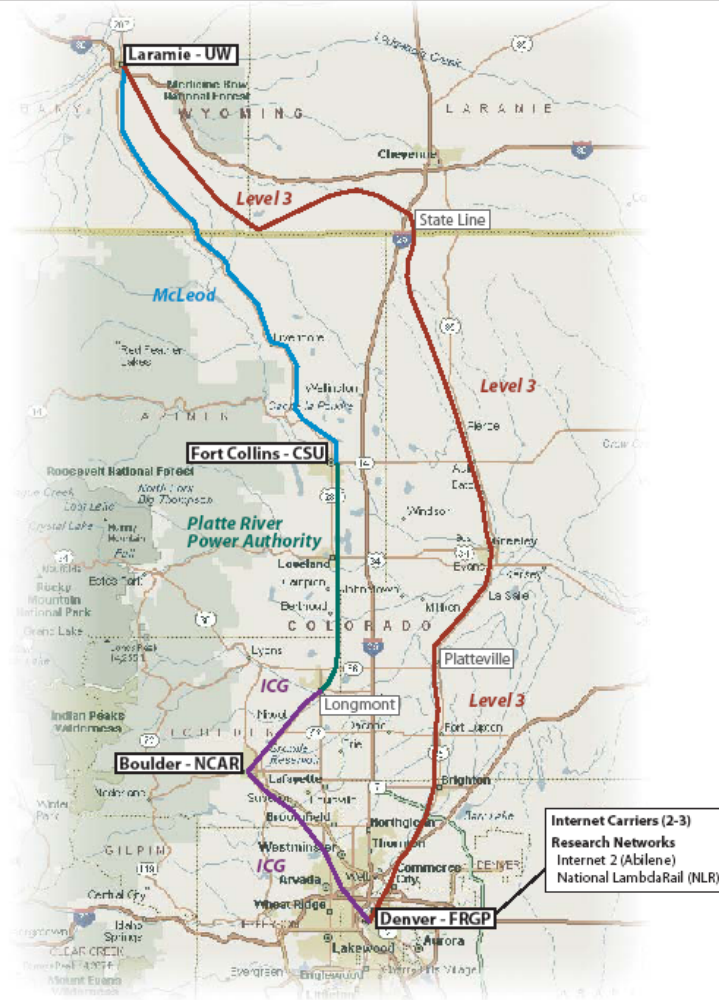


Figure 3. University of Wyoming connections to Internet 2.

Table I. Two-Year Budget Summary

| Item | # of Units | Unit Cost | Project Estimated Costs | | |
|---|------------|-----------|-------------------------|----------|-----------|
| | | | Year 1 | Year 2 | Total |
| Laramie Aggregation Point | | | | | |
| Equipment purchase | 1 | \$19,760 | \$19,760 | | \$19,760 |
| Equipment installation | 1 | \$1,200 | \$1,200 | | \$1,200 |
| Line installation | 1 | \$1,200 | \$1,200 | | \$1,200 |
| Monthly line charges for 12 months | 1 | \$2,092 | | \$25,104 | \$25,104 |
| Annual equipment maintenance | 1 | \$3,282 | | \$3,282 | \$3,282 |
| | | | \$22,160 | \$28,386 | \$50,546 |
| Remote Site Configuration - 1 x T-1 ATM | | | | | |
| Equipment purchase | 65 | \$4,677 | \$304,005 | | \$304,005 |
| Equipment installation | 65 | \$625 | \$40,625 | | \$40,625 |

| | | | | | |
|--|----|---------|------------------|------------------|------------------|
| Line installation - standard | 49 | \$900 | \$44,100 | | \$44,100 |
| Line installation - nonstandard (a) | 14 | \$1,982 | \$27,748 | | \$27,748 |
| Line installation - non standard (b) | 1 | \$2,496 | \$2,496 | | \$2,496 |
| Line installation - non standard (c) | 1 | \$3,848 | \$3,848 | | \$3,848 |
| Monthly line charges for 12 months | 65 | \$378 | | \$294,840 | \$294,840 |
| Annual equipment maintenance | 65 | \$500 | | \$32,500 | \$32,500 |
| | | | \$422,822 | \$327,340 | \$750,162 |
| <i>Remote Site Configuration - 2 x T-1 ATM</i> | | | | | |
| Equipment purchase | 7 | \$4,677 | \$32,739 | | \$32,739 |
| Equipment installation | 7 | \$625 | \$4,375 | | \$4,375 |
| Line installation | 7 | \$1,600 | \$11,200 | | \$11,200 |
| Monthly line charges for 12 months | 7 | \$758 | | \$63,672 | \$63,672 |
| Annual equipment maintenance | 7 | \$500 | | \$3,500 | \$3,500 |
| | | | \$48,314 | \$67,172 | \$115,486 |
| Project total | | | \$493,296 | \$422,898 | \$916,194 |
| Funding requested @ 85% | | | \$419,302 | \$359,463 | \$778,765 |

Additional costs and funding sources

The State of Wyoming is requesting 85% of the projected costs for the development of the Wyoming Telehealth Network from the Federal Communications Commission rural health care pilot program. The remaining 15% of the funding – a total of \$137,429 over the two-year project period – has been committed to the project by the Wyoming Department of Health Public Health and Terrorism Preparedness Program, the state Office of Rural Health, and the Wyoming Association of Mental Health and Substance Abuse Centers (WAMHSAC). Letters confirming these commitments are included with this proposal. In addition, we have commitments from two of the for-profit hospitals included in the network to pay for their share of the equipment, installation, and line charges. (The other two for-profit hospitals in the state were unwilling to commit to the network at this time; if Wyoming is awarded this grant, we will pursue their commitment for support or else they will not be included in the final design.)

We recognize that there will be other costs associated with the development of this network that are not eligible for funding from the FCC, including contract and network management personnel at the University of Wyoming, a project manager, and Steering Committee support. We estimate the additional costs of this support at \$179,050 for the project period, as summarized in Table II. We are currently seeking funding sources for these additional project costs, including the Wyoming Legislature, Congressionally mandated funds, or private foundations that support rural health. An award from the FCC will help leverage these funds more strongly, and we expect them to be in place by the time the project begins. Some of the effort outlined here may be able to be replaced by volunteers should the project be unable to secure this additional support.

Table II. Additional project costs (not requested from FCC)

| Item | # of Units | Unit Cost | Project Estimated Costs | | Total |
|---|---------------|--------------|-------------------------|----------|----------|
| | | | Year 1 | Year 2 | |
| <i>Contract manager at UW</i> | | | | | |
| To be hired Oct 2007-May 2009; 25% FTE (\$1,125 per month plus benefits at 40%; total \$1,575 per month; other support costs | | | | | |
| Salary/Benefits year 1 | 10 | \$1,575 | \$15,750 | | \$15,750 |
| Salary/Benefits year 2 | 12 | \$1,575 | | \$18,900 | \$18,900 |
| Equipment | | | \$3,500 | | \$3,500 |
| Supplies | | | \$500 | \$1,000 | \$1,500 |
| Travel | | | \$1,500 | \$3,000 | \$4,500 |
| Communications | | | \$500 | \$1,000 | \$1,500 |
| | | | <hr/> | <hr/> | <hr/> |
| | | | \$21,750 | \$23,900 | \$45,650 |

Network technician at UW

To be hired Sept 2008-Aug 2009; 100% FTE (\$3,750 per month plus benefits at 40%; total \$5,250 per month)

| | | | | | |
|------------------------|----|---------|--|----------|----------|
| Salary/Benefits year 2 | 12 | \$5,250 | | \$63,000 | \$63,000 |
|------------------------|----|---------|--|----------|----------|

Contracted project manager

To be hired Sept 2007-Aug 2009; 20% FTE (\$1,700 per month contract; other support costs)

| | | | | | |
|----------------------|----|---------|----------|----------|----------|
| Contract year 1 | 12 | \$1,700 | \$20,400 | | \$20,400 |
| Contract year 2 | 12 | \$1,700 | | \$20,400 | \$20,400 |
| Travel | | | \$1,500 | \$4,000 | \$5,500 |
| Communications | | | \$1,200 | \$1,200 | \$2,400 |
| Printing/Duplicating | | | \$500 | \$1,000 | \$1,500 |
| | | | \$23,600 | \$26,600 | \$50,200 |

Steering Committee support

Assume the Committee will meet face-to-face 6 times, by teleconference or web meeting 6 times

| | | | | | |
|-----------------------------|---|---------|----------|----------|----------|
| Travel Costs year 1 | 3 | \$3,000 | \$9,000 | | \$9,000 |
| Travel Costs year 2 | 3 | \$3,000 | | \$9,000 | \$9,000 |
| Teleconference costs year 1 | 3 | \$200 | \$600 | | \$600 |
| Teleconference costs year 2 | 3 | \$200 | | \$600 | \$600 |
| Printing/Duplicating | | | \$200 | \$200 | \$400 |
| Postage/Other | | | \$300 | \$300 | \$600 |
| | | | \$10,100 | \$10,100 | \$20,200 |

| | | | | | |
|-------------------------------|--|--|-----------------|------------------|------------------|
| TOTAL ADDITIONAL COSTS | | | \$55,450 | \$123,600 | \$179,050 |
|-------------------------------|--|--|-----------------|------------------|------------------|

4. Participating Facilities

As described in Section 3 above, the Wyoming Telehealth Network will support high-speed network connectivity for all hospitals, community mental health centers, and substance abuse clinics in the state of Wyoming. A list of these facilities, their locations, and Rural Urban Commuting Area (RUCA) codes is provided in the following tables.

Table III. Address and RUCA code for hospitals participating in the network.

| Facility Name | Address | Zip Code | RUCA Code | Phone # |
|--|---|----------|-----------|----------------|
| Campbell County Memorial Hospital | P.O. Box 3011, Gillette, WY 82717 | 82717 | 4.0 | (307) 688-1000 |
| Carbon County Memorial Hospital | P.O. Box 460, Rawlins, WY 82301 | 82301 | 7.0 | (307) 324-2221 |
| Memorial Hospital of Laramie County d/b/a Cheyenne Regional Medical Center | 214 East 23rd St, Cheyenne, WY 82001 | 82001 | 1.0 | (307) 634-2273 |
| Community Hospital | 2000 Campbell Dr., Torrington, WY 82240 | 82240 | 7.0 | (307) 532-4181 |
| Crook County Hospital | P.O. Box 517, Sundance, WY 82729 | 82729 | 10.0 | (307) 283-3501 |
| Dept. of Veterans Affairs Medical Center | 1898 Fort Road, Sheridan WY 82801 | 82801 | 4.0 | (307) 672-3474 |
| Evanston Regional Hospital | 190 Arrowhead Dr., Evanston, WY 82930 | 82930 | 4.0 | (307) 789-3636 |
| Hot Springs County Memorial Hospital | 150 E. Arapahoe, Thermopolis, WY 82443 | 82443 | 7.0 | (307) 864-3121 |
| Ivinson Memorial Hospital | 255 North 30th St., Laramie, WY 82070 | 82070 | 4.0 | (307) 742-2141 |
| Johnson County Memorial Hospital | 497 West Lott, Buffalo, WY 82834 | 82834 | 7.0 | (307) 684-5521 |
| Lander Valley Medical Center | 1320 Bishop Randall Drive, Lander, WY 82520 | 82520 | 7.0 | (307) 322-4420 |
| Memorial Hospital of Converse County | P.O. Box 1450, Douglas, WY 82633 | 82633 | 7.0 | (307) 358-2122 |
| Memorial Hospital Sheridan County | 1401 West 5th Street, Sheridan, WY 82801 | 82801 | 4.0 | (307) 672-1000 |
| Memorial Hospital Sweetwater County | P.O. Box 1359, Rock Springs, WY 82901 | 82901 | 4.0 | (307) 362-3711 |
| Niobrara Health and Life Center | 921 S. Ballencee, Lusk, WY 82225 | 82225 | 10.0 | (307) 334-4000 |
| North Big Horn Hospital | 1115 Lane 12, Lovell, WY 82431 | 82431 | 10.0 | (307) 548-5200 |
| Platte County Memorial Hospital | P.O. Box 848, Wheatland, WY 82201 | 82201 | 7.0 | (307) 322-3636 |
| Powell Valley Healthcare | 777 Avenue H, Powell, WY 82435 | 82435 | 7.0 | (307) 754-2267 |
| Riverton Memorial Hospital | 2100 W. Sunset Drive, Riverton, WY 82501 | 82501 | 4.0 | (307) 856-4161 |
| South Big Horn County Hospital District | 388 South US Hwy. 20, Basin, WY 82410 | 82410 | 10.0 | (307) 568-3311 |
| South Lincoln Medical Center | P.O. Box 390, Kemmerer, WY 83101 | 83101 | 7.0 | (307) 877-4401 |
| St. John's Medical Center | P.O. Box 428, Jackson, WY 83001 | 83001 | 4.0 | (307) 733-3636 |
| Star Valley Medical Center | P.O. Box 579, Afton, WY 83110 | 83110 | 10.0 | (307) 885-5800 |
| V.A. Medical Center | 2360 E. Pershing BLVD. Cheyenne, WY 82001 | 82001 | 1.0 | (307) 778-7550 |
| Washakie Medical Center | P.O. Box 700, Worland, WY 82401 | 82401 | 7.0 | (307) 347-3221 |
| West Park Hospital | 707 Sheridan Avenue, Cody, WY 82414 | 82414 | 7.0 | (307) 527-7501 |
| Weston County Health Services | 1124 Washington, Newcastle, WY 82701 | 82701 | 7.0 | (307) 746-4491 |
| Wyoming Behavioral Institute, Ltd. Co. | 2521 East 15th Street, Casper, WY 82609 | 82609 | 1.0 | (307) 237-7444 |
| Wyoming Medical Center | 1233 East 2nd Street, Casper, WY 82601 | 82601 | 1.0 | (307) 577-7201 |
| Wyoming State Hospital | P.O. Box 177, Evanston, WY 82931 | 82931 | 4.0 | (307) 789-3464 |

Table IV. Address and RUCA code for community mental health centers and substance abuse clinics participating in the network.

| Facility Name | Address | Zip Code | RUCA Code | Phone # | Mental Health | Substance Abuse |
|---|---|----------|-----------|----------------|---------------|-----------------|
| Behavioral Health Services at Campbell County Memorial Hospital | P.O. Box 3011 501 S. Burma Ave., 5th Floor Gillette, WY 82717 | 82717 | 4.0 | (307) 688-5000 | X | X |
| Big Horn County Counseling: Basin | P.O. Box 351 Greybull, WY 82426 | 82426 | 10.0 | (307) 568-2020 | X | X |
| | 116 South 3rd St Basin, WY 82410 | 82410 | 10.0 | | | |
| Big Horn County Counseling: Lovell | 25 W. 10th Street Lovell, WY 82431 | 82431 | 10.0 | (307) 548-6543 | X | X |

| | | | | | | |
|---|--|-------|------|----------------|---|---|
| Carbon County Counseling Center | 721 Maple Street P.O. Box 1056 Rawlins, WY 82301 | 82301 | 7.0 | (307) 324-7156 | X | X |
| Cedar Mountain Center (West Park Hospital) | 707 Sheridan Avenue Cody, WY 82414 | 82414 | 7.0 | (307) 578-2421 | | X |
| Central Wyoming Counseling Center | 1430 Wilkins Circle Casper, WY 82601 | 82601 | 1.0 | (307) 237-9583 | X | X |
| Central Wyoming Counseling Center: New Directions | 1514 E. 12th Street, Suite 101 Casper, WY 82601 | 82601 | 1.0 | (307) 237-6033 | X | X |
| Central Wyoming Counseling Center: New Horizons | 837 East C Street Casper, WY 82601 | 82601 | 1.0 | (307) 237-7077 | X | X |
| Central Wyoming Counseling Center: Reflections | 1514 East 12th Street Cottage D Casper, WY 82601 | 82601 | 1.0 | (307) 237-5041 | X | X |
| Cornerstone (Mountain Regional Services) | PO Box 6005 Evanston WY 82930-6005 | 82930 | 4.0 | (307) 789-0715 | | X |
| Curran-Seeley Foundation | P.O. Box 11390 Jackson, WY 83002 | 83002 | 4.0 | (307) 733-3908 | | X |
| Solutions for Life - Douglas | 1841 Madora Ave. Douglas, WY 82633 | 82633 | 7.0 | (307) 358-2846 | X | X |
| Solutions for Life - Glenrock | 525 W. Birch Glenrock, WY 82637 | 82637 | 10.4 | (307) 436-8335 | X | X |
| Solutions for Life - Lusk | 905 South Main Street Lusk, WY 82225 | 82225 | 10.0 | (307) 334-3666 | X | X |
| Fremont Counseling Service: Lander | 748 Main Street Lander, WY 82520 | 82520 | 7.0 | (307) 332-2231 | X | X |
| Fremont Counseling Service: Riverton | 1110 Major Ave. Riverton, WY 82501 | 82501 | 4.0 | (307) 856-6587 | X | X |
| Fremont County Alcohol Crisis Center | 223 W. Adams Riverton, WY 82501 | 82501 | 4.0 | (307) 332-2231 | | X |
| High Country Counseling and Resource Center | P.O. Box 376 389 Adams Afton, WY 83110 | 83110 | 10.0 | (307) 885-9883 | X | X |
| High Country Counseling and Resource Center | 41 1/2 South Franklin Street Pinedale, WY 82941 PO Box 858 | 82941 | 10.0 | (307) 367-2111 | X | X |
| High Country Counseling and Resource Center | 821 Sage Ave. Kemmerer, WY 83101 | 83101 | 7.0 | (307) 877-4466 | X | X |
| Hot Springs County Counseling Center | 121 South 4th Street Thermopolis, WY 82443 | 82443 | 7.0 | (307) 864-3138 | X | X |
| Jackson Hole Community Counseling Center | PO Box 1868 115 W Snow King Jackson WY 83001 | 83001 | 4.0 | (307) 733-2046 | X | |
| Mercer House | 425 CY Ave. Casper, WY 82601 | 82601 | 1.0 | (307) 265-7366 | | X |
| Northern Wyoming Mental Health: Sheridan | P.O. Box 3079 113 West Brundage Sheridan, WY 82801 | 82801 | 4.0 | (307) 672-8958 | X | X |
| Northern Wyoming Mental Health: Buffalo | 521 W. Lott St. Buffalo, WY 82834 | 82834 | 7.0 | (307) 684-5531 | X | X |
| Northern Wyoming Mental Health: Sundance | PO Box 646 420 1/2 Main Street Sundance WY 82729 | 82729 | 10.0 | (307) 283-3636 | X | X |

| | | | | | | |
|--|--|-------|------|----------------------------------|---|---|
| Northern Wyoming Mental Health: New Castle | 420 Deanne Avenue Newcastle WY 82701 | 82701 | 7.0 | (307) 746-4456 | X | X |
| Pathfinder | 1920 Thomes Ave., Suite 320 Cheyenne, WY 82001 | 82001 | 1.0 | (307) 635-0256 | | X |
| Peak Wellness Center: Albany County | 1263 N. 15th St. Laramie, WY 82072 | 82072 | 4.0 | (307) 745-8915 | X | X |
| Peak Wellness Center: Goshen County | 501 Albany Ave Torrington, WY 82240 | 82240 | 7.0 | (307) 532-4091 | X | X |
| Peak Wellness Center: Laramie County | P.O. Box 1005 2526 Seymour Ave. Cheyenne, WY 82003 | 82003 | 1.0 | (307) 634-9653 | X | X |
| Peak Wellness Center: Platte County | P.O. Box 1078 1945 West Mariposa Parkway Wheatland, WY 82201 | 82201 | 7.0 | (307) 322-3190 | X | X |
| Pioneer Counseling Services | 350 City View Dr., Suite 302 Evanston WY 82930 | 82930 | 4.0 | (307) 789-7915 | X | |
| Pioneer Counseling Services | 303 South Main Lyman WY 82937 | 82937 | 10.5 | (307) 786-2105 | X | |
| Sho-Rap Lodge: White Buffalo Healing Journey Center (W.B.H.J.C.) | P.O. Box 789 10457 HWY 789 Ft. Washakie, WY 82514 | 82514 | 10.0 | (307) 332-2334 | | X |
| Southwest Counseling Service: Administrative Offices | 1124 College Road Rock Springs, WY 82901 | 82901 | 4.0 | (307) 352-6677 | X | X |
| Southwest Counseling Service: House | 1414 9th Street Rock Springs, WY 82901 | 82901 | 4.0 | (307) 352-6685 | X | X |
| Southwest Counseling Service Foothill | 2300 Foothill Blvd Rock Springs WY 82901 | 82901 | 4.0 | (307) 352-6677 | X | X |
| Washakie Mental Health Services Inc. | 206 S. 7th St. Worland, WY 82401 | 82401 | 7.0 | (307) 347-6165 | X | X |
| WYSTAR | 1003 Saberton Ave. Sheridan, WY 82801 | 82801 | 4.0 | (307) 672-2044 (307) 673-2510 | | X |
| Yellowstone Behavioral Health Center | 2538 Big Horn Avenue Cody WY 82414 | 82414 | 7.0 | (307) 587-2197 | X | |

5. Experience in Telemedicine Programs

There has been demonstrated support for telehealth in Wyoming. Wyoming currently has several active state and federally supported telehealth applications, including those at the Veteran's Health Administration medical centers in Cheyenne and Sheridan and links between the Wyoming State Hospital in Evanston and the State Penitentiary in Rawlins, primarily for mental health services. Private applications have also been developed, including a project linking Converse County Hospital in Douglas to the Wyoming Medical Center in Casper and one linking North Big Horn Hospital in Lovell to the Shriners' Hospital in Salt Lake City, Utah, among others.

Wyoming Department of Health/University of Wyoming: Wyoming Network for Telehealth

While the services available through these linkages have been valuable, they have been available only to a limited population within the state. There is considerable interest in expanding Wyoming's telehealth capabilities. A 2002 survey of health care practitioners and facilities conducted for the Wyoming Department of Health by the University of Wyoming's Survey Research Center indicated that while only 38% of the individuals and 29% of facilities responding to the survey had ever used telehealth for any purpose (even continuing education), nearly half of the respondents would be "interested" in developing partnerships to support a telehealth network of services. In addition, the survey provided a list of 163 facilities or practitioners who asked for more information about telehealth technology or developing such partnerships.

To address the issues identified by the survey, the Wyoming Department of Health obtained funding through Wyoming's Congressional delegation in 2004 to establish the Wyoming Network for Telehealth (WyNETTE). WyNETTE's primary goal has been to develop a technology-based infrastructure to make healthcare resources more available to Wyoming residents. The 2006 Wyoming State Legislature recently appropriated additional funds for continuing WyNETTE activities.

The WyNETTE project is cooperatively managed by the Wyoming Department of Health's Office of Telehealth/Telemedicine and the University of Wyoming Center for Rural Health Research and Education (CRHRE). The Department of Health provides the management and policy development functions, while the CRHRE coordinates the developmental activities and provides equipment, supplies, and technical and training support for the network's participants. A third partner in the project is the Institute for Rural Health at Idaho State University, which has managed several similar projects and serves WyNETTE in an advisory capacity. By linking resources from the state and university to an established program in Idaho, WyNETTE has begun to advance the usage of telehealth in Wyoming through the participation of professional and community organizations throughout the state.

The project consists of three components: (a) telemedicine, which includes patient care activities such as consultation, supervision, home health, disease management and interdisciplinary case conferences; (b) education, which focuses on new providers who are "place committed," upgrading practicing professionals and facilitating continuing health education for CE and CME certification; and (c) informatics, which focuses on distributed digital resources such as digital medical libraries and policy, legal, and regulatory resources. A major focus of WyNETTE in the area of telemedicine has been on the use of telecommunications for mental health and substance abuse counseling. Several organizations within the state are partnering with WyNETTE to develop these services, including the Social Security Administration, Wyoming Recovery LLC, Wyoming Behavioral Institute, among others. Evaluations of these programs are currently underway to assess the satisfaction of the providers and clients with the technology and the associated changes in productivity and cost.

In addition, WyNETTE has offered seminars and Web-based information to providers and health care entities on patient safety issues, as well as preparation for development of electronic medical records systems that are likely to be required in future years. WyNETTE has also made digital library access available to every hospital in the state. The network is also working with the recently formed Wyoming Health Information Organization (WyHIO) to coordinate education and management efforts in health care information technology.

Cheyenne Regional Medical Center: SE Wyoming Telehealth Network

Another partner in this project, Cheyenne Regional Medical Center, received two congressionally mandated grants through the Office for the Advancement of Telehealth (OAT) to develop telehealth capabilities in the region. The Southeast Wyoming Telehealth Network, or SEWTN has been the result of those efforts.

The first grant, awarded in 2005, specifically addressed the telehealth needs in southeastern Wyoming. Through the grant funding, Cheyenne Regional presently operates sixteen video conferencing units, along with a Polycom MGC-50 bridge, all coordinated by a Readmanager SE200 management piece. The telehealth program is supported by three employees including the Televideo Coordinator, Telehealth Coordinator, and Director of Outreach Services.

In the year 2006, Cheyenne Regional was awarded its second grant, for the purpose of developing regional capabilities. The goals of the program were and are to deploy video conferencing infrastructure in the Cheyenne Regional service area, to deploy clinical application peripherals in network facilities based on clinical needs, and to develop and implement an interactive clinical education series. To this end, mobile video conferencing units, and the necessary network infrastructure components were purchased and delivered to six Wyoming hospitals, including facilities in Laramie, Rawlins, Lusk, Douglas, Wheatland, and Torrington. These units tie into Cheyenne Regional's Readmanager SE200 device as well.

Delegates from each of these facilities have met a number of times over the last year to find solutions and processes for network organization and technical development. Since usage began in 2006, Cheyenne Regional and its partners have participated in over forty video conference events. The primary focus to date has been to receive and provide professional healthcare education. Events Cheyenne Regional has received include Basic Emergency Nurse Training out of Washington State, the Nebraska Stroke Symposium from Omaha, a Paramedic Refresher Course relayed from Fort Collins, CO, and an all-day lab CECH series from the ASCLS also relayed from Fort Collins, CO. In addition, Cheyenne Regional has been the provider for a number of professional healthcare education courses, including Cheyenne Regional Grand Rounds presentations, which offer a chance for physicians to earn CME's, a Stroke Center inservice to Douglas, WY, and a Wound Care Lecture which was presented to a class of physical therapy students in Bismarck, ND. Cheyenne Regional has also provided, on a monthly basis, community educational lectures centered on bariatric surgery to Casper, WY. The network has also participated in or facilitated a number of administrative video conference meetings involving regional hospitals, and the Wyoming Hospital Association.

As part of the goals set forth in the grant, the SEWTN will continue to develop more applications. There are an increasing number of educational events that the member hospitals will begin to share, and a number of administrative video conference opportunities that are being requested. Also, through the grant funding, the network has purchased a number of electronic stethoscopes and digital cameras for use in clinical applications which will be developed in the near future. Clinical telehealth projects include dermatology, wound care, psychiatry, pediatric echocardiology, cardiology, and emergency care.

Additional telehealth resources

These network partners' experience with telehealth projects has not only created a solid foundation for developing a statewide system, it has also provided them with access to a wide variety of outside resources and expertise. Both projects support staff memberships in the American Telemedicine Association, which sponsors a number of activities relating to telehealth, including an annual conference. The projects also support participation in grantee meetings sponsored by the Office for the Advancement of Telehealth (OAT), a unit of the Health Resources and Services Administration (HRSA). These meetings are intended as resources for current and past OAT grantees for seeking funding and developing networks.

In addition, representatives from both the WyNETTE and the SEWTN projects serve on the board for the Northwest Regional Telehealth Resource Center (NRTRC), a resource center for developing telehealth programs established in 2006 with OAT funding. The NRTRC, which is coordinated through Inland Northwest Health Services in Spokane, Washington, is intended to assist in the development of new telehealth networks and applications in several Western states (including Wyoming), Alaska, Hawaii and the U.S.-affiliated Pacific Islands.

Finally, the University of Wyoming was recently awarded a Rural Health Network Development Planning Grant from the HRSA Office of Rural Health Policy. This one-year grant is intended to support strategic planning for the SEWTN (in cooperation with Cheyenne Regional Medical Center), including identifying critical needs for the network, setting goals and developing evaluation tools, and defining ways to sustain the network's activities. An interim board of directors for the SEWTN has been established and a series of planning meetings and activities initiated. Ms. Thelma McCloskey Armstrong, executive director of the Eastern Montana Telemedicine Network and a past president of the American Telemedicine Association, serves as an advisor to this project. We believe that the planning activities to be carried out under this grant for the SEWTN will provide the groundwork for a statewide telehealth network such as that being proposed here. Furthermore, this grant provides access to other resources, such as those provided by the National Cooperative of Health Networks, an association of health network executives and strategic health partners that supports and strengthen health alliances through collaborative efforts, networking, and educational opportunities.

6. Management and Coordination Plan

The proposed Wyoming Telehealth Network will link patients to health care providers across Wyoming using the most current telecommunications technology, providing rural patients and providers with access to services that are usually available only in more populated urban areas. The network will use the telecommunications connectivity requested in this proposal to deliver patient care, provide continuing education to health professionals, and to meet other healthcare needs among Wyoming's rural populations.

Management structure

The design and implementation of the network will be contracted out to a capable agency through competitive bidding. As the fiscal and contracting agent for the project, the University of Wyoming Center for Rural Health Research and Education (CRHRE) will manage this contract, maintain deadlines, purchase and track equipment, and perform other activities relating to the contract. A contract manager hired with separate funds during the project period will carry out these activities.

Formal governance of the network throughout its development and subsequent operation will be carried out by a Steering Committee comprised of representatives of the network partners listed earlier, as well as representatives from facilities participating in the network. Throughout the project, this committee will meet regularly with the contractor to review progress of the design and implementation activities against the work plan. In addition, the committee will provide oversight during the competitive procurement process for the design, implementation, and operation of the network; develop a plan for growth and sustainability; provide a forum for member input, foster collaboration among members; and strengthen the ability of network members to function as a consortium.

A project manager will work with the Steering Committee to assure successful implementation of the network, as well as designing and implementing procedures for the non-technical operations of the network. This individual will ensure compliance with the contract terms, track and report on contract activities, coordinate with supplier and vendors, and provide change management for the project as it progresses.

The Wyoming Health Information Organization (WyHIO) will assist in the initial project management services and, following successful implementation, coordinate first-level help desk support, training, scheduling, and recruiting additional users.

Requirements and product deliverables

Initially, the network will be used to deliver mental health, substance abuse, and similar counseling and treatment services, primarily through the use of Internet-based videoconferencing. As numerous studies have shown, this technology enables patients and health care providers at distant sites to interact effectively. Additionally, it supports rural health care providers' participation in a variety of professional and patient educational offerings. Network participants may access continuing educational offerings over the Internet to meet their individual needs. The network would also be an excellent way to provide statewide meetings of professional and support groups.

The proposed network, therefore, must provide for both videoconferencing and data services, using current video and data standards. The preferred standard (H.323) would provide for connection using a computer IP address. However, the network must be capable of supporting both IP based connections and other traditional methods (H.320). It is expected that the various sites will be making connection using varying bandwidths, and the network must support sites running at different speeds. Up to 24 sites should be available for connection into a single conference at any time, including sites within and outside the network. The network must support major brands of videoconferencing equipment as long as the equipment is H.320 or H.323 compliant.

Quality of Service (QoS) is a measure of how smoothly a transmission moves from one end point on the network to another. Videoconferences will need to be provided on a best effort basis. The network will be architected to accommodate the much larger size of video packets and to minimize packet loss. Bandwidth controls will be used to avoid over subscription of network services. Additional bandwidth will be estimated for overhead, and some available bandwidth on the network will have to be reserved to help ensure a high quality of service.

Security for the network will be designed with the implementation contractor to ensure the security and integrity of the information being transmitted, as well as to comply with all HIPAA requirements. The network will be protected by firewalls at all entry points on the network. Virtual Private Networks (VPNs) will be used to securely connect network members to non-network partners and business associates. Additional protection tools expected to be deployed within the network include:

- Secure email, with scanning of all messages to prevent viruses;
- Intrusion detection and protection, with real time reporting and continual update of all related software;
- Anti-spy ware;
- Regular reporting to network members on breaking security issues and tools to increase security levels;
- Real time monitoring of network status for network connections, firewall and IDP activity, network traffic anomalies, status of network devices, etc.

Procurement procedures

We will use a competitive procurement process to select and employ a primary vendor to design and implement, as well as provide the technical operation and maintenance of, the network. The University of Wyoming, as the lead entity in the consortium, will assume the primary responsibility for the procurement, with oversight provided by the Steering Committee. The University of Wyoming Purchasing Manual requires all purchases of goods and services over \$7,500 be competitively bid. The intent is to issue a Request for Proposal (RFP) containing instructions governing the proposal and the material to be included, mandatory requirements which must be met to be eligible for consideration, and other requirements. The process would be conducted through the University of Wyoming, Purchasing Office. A fixed price bid will be preferred to limit the initial costs of the network.

Major deliverables from the vendor will include:

- A project plan and network design, consisting of the following:
 - Technical solution;
 - Project scope;
 - Project budget, time schedule, and management plan;
 - Project risks and contingencies;
- Continuing progress reports, charting progress against budget, resources used, and schedule;
- A network test plan and progress reporting against the plan;
- A network roll out plan to include the network connections, end point equipment installation, training, and acceptance by the Project Manager;
- An ongoing technical network management plan and cost estimates.

As needed changes to the project scope or functional requirements are identified, the installation contractor will be requested to provide a written estimate of the costs, resources needed, and the impact on the implementation schedule. The project manager will review the request, estimate the impacts on the network team, and make a recommendation to the Steering Committee. The Steering Committee will evaluate the change request in light of need, budget and resource availability, and impact on project schedule. All changes to the project scope and budget must be within existing budget constraints and be pre-approved by the Steering Committee; the contract/work plan must also be formally amended before any changes of this nature can be undertaken.

Network site responsibilities

Training for telehealth personnel will consist of both basic videoconferencing and additional training, as needed. Each network site must have a minimum of two individuals trained in the following areas:

- Basic set-up of videoconferencing equipment;
- Turning the videoconference equipment on/off properly;
- Moving the equipment from room to room, if applicable;
- Changing camera views;
- Centering the view of the participants depending on the type of session;
- Explaining to participants how to do the following:

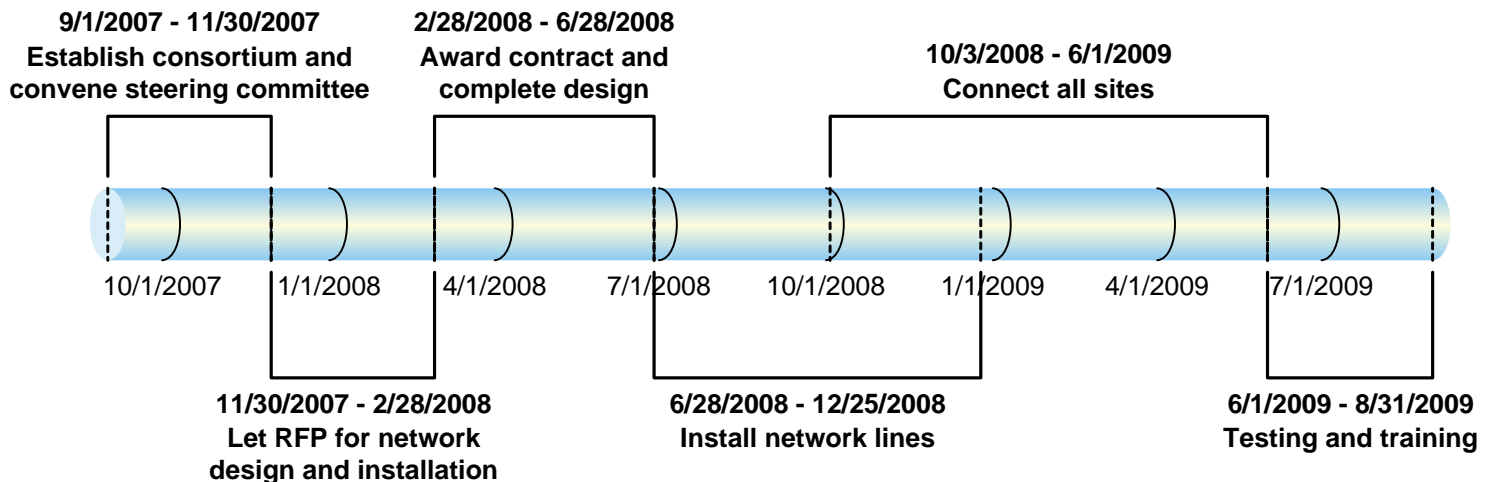
- Muting;
- Changing the camera view if desired;
- Using peripherals like the hand held cameras or document cameras;
- Changing camera views from the room to the peripherals.

Additional videoconferencing training, as needed, would include:

- Advanced use of the videoconferencing equipment, such as direct dialing, saving slides, etc.)
- Use of the medical peripherals, as needed.
- Presenting techniques in front of a camera.
- Telehealth risk management, quality assurance, and health insurance coverage.
- Mock clinic: a practice run prior to beginning a new patient care clinic.

Timeline and coordination plan

We expect to complete the activities in the proposed project within two years of their initiation. The diagram below outlines the proposed timeline for the project. This timeline assumes a start date of September 2007; if the project initiation is delayed, the schedule will be adjusted accordingly.



As indicated above, the Steering Committee will coordinate with the University of Wyoming to set up and carry out the competitive bidding process for the network design and installation. Once the contract is in place, the Steering Committee will set up a series of pre-implementation meetings with the project manager and the contractor to outline roles, responsibilities, and deliverables and produce a comprehensive implementation plan. A comprehensive project schedule, to be included in this plan, will outline the specific tasks and lead times for their completion.

The project manager will work with the contractor to assure that the contractor and all third-party vendors work in harmony to implement the network according to the contract specifications and deadlines. This person will also track all activities against the project schedule, coordinate final acceptance testing, and provide documentation for use in technical and customer support activities after implementation is complete.

7. Sustainability

Developing technology for health care interventions in rural populations involves significant investment of both money and time. Rural providers generally operate in small clinics or hospitals, for which such an investment is a major barrier. Moreover, many rural providers are unfamiliar with the technology available or its potential benefits and are therefore reluctant to adopt it. Together, these barriers can negatively impact rural health care in two ways: (1) they prevent many providers from taking advantage of the benefits that technology can offer, and (2) they cause problems in recruiting into rural practice newly prepared providers, who both know the value of technology and expect a certain level of it to be available.

Establishing a dedicated telehealth network for the hospitals, mental health clinics, and substance abuse treatment centers in Wyoming will provide a foundation for developing applications that can help providers in the state become more familiar with the available technology and, perhaps more importantly, become more comfortable with adopting and using it. Clearly, however, the network must be sustained over time in order for this to take place. This section addresses the ways in which the Wyoming Telehealth Network can be sustained.

Table V below outlines the estimated ongoing network costs.

Table V. Estimated ongoing costs for the Wyoming Telehealth Network.

| | |
|---|------------------|
| Annual network line costs | \$383,616 |
| Annual network line maintenance cost | \$39,282 |
| Annual network management cost estimates | \$26,600 |
| Annual steering committee/ board cost estimates | \$10,100 |
| Estimated equipment upgrade costs (Based on 5 year rotating replacement) | \$71,300 |
| USF annual network line reimbursement (Estimating 30% reimbursement) | -\$115,084 |
| Total estimated network annual costs | \$415,814 |

For the Wyoming Telehealth Network to continue its mission after the pilot program funding ends, these costs must be addressed. The Steering Committee and the network partners that they represent will devote considerable attention to this issue after the activities of designing and installing the network have been initiated. The planning committee has, however, already identified a number of options and concerns related to sustainability.

First and foremost, the members of the network must be educated about USF reimbursement. Some hospitals already are taking advantage of the USF program, but not all. We expect that the Steering Committee can provide assistance in applying for these funds by providing examples or potentially group applications.

Secondly, we hope to secure state funding, possibly following models such as the Nebraska Statewide Telehealth Network which is supported through a combination of USF reimbursement, state funding through the Nebraska Universal Service Fund, and a minimal consortium fee. Application to Federal grant programs such as those available through the HRSA Office for the Advancement of Telehealth or the USDA Rural Utilities Service Distance Learning and Telemedicine program will also be explored; the University of Wyoming has significant experience in working with these programs and can lead the application process, as it has with this program. The Montana-Wyoming Area Indian Health Board could be another potential source of funding through grants or membership fees, as the Wind River Indian Reservation (one of the largest in the country) is located in central Wyoming and could benefit from telehealth connections throughout the state.

There are a number of other ways that continued support for the network activities could be found. The Social Security Administration is currently conducting a video consultative examination pilot program in Wyoming. The purpose of the SSA pilot is to show that mental status exams for initial consults,

reconsiderations, and continuing disability reviews for individuals applying for disability due to mental health reasons is more cost effective if done through videoconferencing. Initial project data demonstrates that there is a cost savings of approximately \$100 per consult plus travel time. If the pilot project is successful, the SSA will benefit from having a robust Wyoming telehealth network to support an expanded program, and they have expressed willingness to explore financial support for a larger network.

A membership model has been successful in other telehealth networks, and we certainly plan to consider this as a way to sustain this network. Network administration and members will inventory possible constituents that may benefit from telehealth availability and explore opportunities to secure grants, user fees, or membership fees. Group purchasing organizations would be used to lower costs of network equipment and connectivity costs for the members.

Fee-for-service activities can also help defer network costs. Some possibilities for these include:

- Non-member healthcare use. For example, a large number of educational and clinical opportunities are provided by the WWAMI (Washington-Wyoming-Alaska-Montana-Idaho) Medical Education Program. A number of healthcare clinics and colleges would have interest in participating in these through a video medium and could be charged for their use of the network systems.
- Non-member community use. Systems could be made available for a fee, to be used for appropriate uses to the community during downtimes to maximize usage.

Equally important as funding to the sustainability of the network is the demonstration of the value of telehealth to the network members and the constituencies they serve. The Wyoming Telehealth Network will focus on the development and implementation of a set of core competencies and applications based on the expertise, interest, and needs presented by members. To maximize the opportunity for success, the network will focus on developing only a few new programs each year. The network will provide accurate reporting of activities and statistics to its members, which will demonstrate the value of the network and facilitate decision making by member organizations. The network will also enlist the aid of the Regional Telehealth Resource Centers in order to share the knowledge, experience, and support they offer.

Active participation and commitment to the network by its members are also key. Commitments of at least three years will be encouraged for network members through Memorandums of Agreement. The network plan will address formalization to define the rules for participation and set boundaries for the network activities. This will facilitate coordinated and consistent operations. Member education is another key component to network long-term success and sustainability. Members will be fully educated about system capabilities to enhance their decision making regarding projects and applications.

Another important factor is good communication among the members and the administration. There are a number of technology-based tools that can be implemented to ensure this, including a network Web site, video and/or audio meetings, webinars, newsletters, site visits from network administration, and regular network email updates.

Finally, physician support and involvement is critical to long-term sustainability. Several physician champions have been identified throughout the state and are already involved in projects such as development of electronic health records, transmission of trauma transfer information, e-prescribing and using videoconferencing for education, all appropriate activities for use on a statewide network. We are confident that the establishment of the Wyoming Telehealth Network will continue to demonstrate to health care providers the value of telehealth for improving the access to, and quality of, health care to the residents of our state.

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9. Letters of Commitment and Support

Letters of commitment to the additional funding required by the program are attached. Letters of support from organizations participating in the proposed steering committee, other individuals and agencies involved or with interest in this project, and Wyoming's Congressional delegation are also attached.

10. Appendix

The Appendix contains preliminary cost estimates for the network sites that were prepared in cooperation with Qwest Communications and used to determine the funding request.